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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In the Application of:

Andreas EBERT

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For: METHOD AND DEVICE FOR MAPPING CONTROL CHARACTERS

RESPONSE TO NOTIFICATION OF MISSING REQUIREMENTS

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

This is in response to the Notification of Missing Requirements under 37 C.F.R. § 371 mailed October 29, 2001 and having a period for response set to expire on December 29, 2001. The Notification indicated that the translation of the International Application filed on September 17, 2001 was missing several pages, including the pages containing the original claims. Another copy of the English translation of the original application and the amended pages in the annexes to the International Preliminary Examination Report is submitted herewith. With the submission of the English translation, all requirements under 35 U.S.C. § 371 should be met. Therefore, it is respectfully requested that this application proceed into the national phase.

If any further fees are required in connection with this Response or filing of the English translation, please charge same to our Deposit Account No. 19-3935.
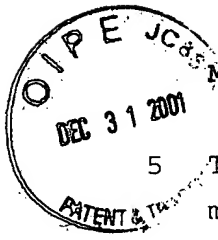
Respectfully submitted,

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Description

Method and device for mapping control characters

5　The invention relates to a method and a device for mapping control characters.

In the mobile use of a computer, for example a PDA (Personal Digital Assistant) or a notebook, it is
10　possible in just the same way as with a stationary computer to access the Internet, for example via a GSM air interface. The information on the Internet is usually offered in the form of a Hypertext Markup Language (HTML), which has a multiplicity of control
15　characters, known as "tags", for special display. Furthermore, there is a clear trend toward more and more such tags, with ever increasing functionality.

Access to a computer network such as the Internet via
20　an air interface has the disadvantage that the air interface does not maintain the same bandwidth for data exchange, as is the case in a fixed network. This effect of the actually too small bandwidth is additionally exacerbated by the numerous multimedia
25　functionalities of the HTML pages on the Internet, which provide a varied, full and attractive presentation at the expense of an adequately high data transmission rate.

30　A mobile computer, which for example calls up such multimedia displays via the air interface, requires loading times which are usually likely to be unacceptable to a user. For example, there are numerous HTML pages (also: home pages, Internet pages)
35　which comprise several 100 Kbytes of data to be loaded. With a transmission rate of, for example, 9600 bits/s, this leads to loading times with which economical working is scarcely possible.

The **object** of the invention is to ensure in the case of mobile computers or a low bandwidth of a transmission channel an efficient mode of working, in particular when accessing a computer network from the mobile
5   computer.

This object is achieved according to the features of the independent patent claims. Developments of the invention also emerge from the dependent claims.
10

To achieve the object, a method for mapping control characters in which the control characters are elements of a hypertext markup language is specified. First data are read in and predetermined control characters
15   are ascertained in the first data. The control characters are used to map the first data onto second data according to a predetermined parameter.

In this case, it is particularly advantageous that the
20   mapping of the data allows a mobile computer, for example a PDA or a notebook, which is preferably connected via an air interface to a computer network, for example the Internet, to make efficient use for the mobile computer of the available bandwidth or the
25   available resources (hardware, software) on the mobile computer.

The predetermined parameter may provide, in particular, information on the hardware used in the mobile computer
30   (for example resolution of the display, details on color information, available plugins). This parameter is consequently used with preference to adapt the available bandwidth to the special capabilities of the respective mobile computer.

It should be noted here that the mobile computer is preferably connected via an air interface to a computer network, the air interface generally having a lower bandwidth than a comparable fixed network connection.

5 The computer network may be, in particular, the Internet. On the mobile computer there runs in particular a program for displaying information, for example what is known as an Internet browser (browser for short). With this browser, information, which is

10 preferably in the form of a hypertext markup language, can be displayed. In particular, the mobile computer receives the information from a (usually stationary) computer (representative of the computer network), referred to as a server. This server may alternatively

15 also be what is known as a proxy server. The information is sent from the server in a format which can be read by the mobile computer (for example as an HTML document). The diverse possibilities of HTML displays usually require an adequately "fast"

20 connection for an acceptable rate of display, that is a transmission channel which has a certain minimum bandwidth between the mobile computer and the server. An ISDN connection with 64 kbits/s, or the analog equivalent according to the V.90 standard (transmission

25 rate: up to 56 kbits/s), is customary for use of the diverse HTML display capabilities.

To be able also to work on the mobile computer with the information actually of interest (possibly with a

30 restriction in the diversity of multimedia displays), an adequately fast display is necessary, in particular the time period between requesting the information and the display. This fast display is ensured by the method described above, in that a type of display and

35 of transmission specifically suited to the capabilities of the mobile computer is ascertained in particular on the basis of the predetermined parameter (which takes into account the hardware of the mobile computer or the

possible transmission rate) and is used.

The scenario described, with a mobile computer and fixed network computer which exchange data via an air interface, is presented by way of example for illustration purposes. Alternatively, for example, the
5 mobile computer may also be a stationary computer and the air interface may be a fixed network connection. The computer network may also be any desired network.

Within a development, the second data may represent the
10 empty set.

One development is that the control characters are HTML tags. In this case, the HTML tags preferably have a structure such that the following applies:

15

    <TAG> ... </TAG>

where "TAG" denotes a dummy for a desired HTML tag, the parentheses emphasise the HTML tag and the oblique "/"
20 identifies the end of the control character sequence. Information, indicated by "...", is usually contained between the control characters.

Another development is that the parameter is
25 dynamically ascertained. In this case, certain requirements or capabilities of the mobile computer or server (analogous to the above example) are dynamically investigated. In particular, new display capabilities on the mobile computer, caused for example by exchange
30 of a display, can be taken into account.

One refinement is that the mapping of the control characters is carried out onto a subset of all the possible control characters.

Another refinement is that the control characters are mapped with at least one of the following mechanisms taken into account:

5   a) Identical mapping:
       The control character belongs to the known control characters and is passed on unchanged. Display takes place on the mobile computer.

10   b) Extraction of information:
       The control character is unknown or is not to be displayed. However, the information contained is to be displayed, preferably transparently (that is without further control information).

15

       c) Conversion to similar control characters:
       The control character is unknown or is not to be displayed, reverting instead to an alternative control character, preferably with a similar
20   effect.

       d) Erasure:
       The control character is unknown or is not to be displayed; information possibly contained is also
25   not of interest: control character/s and information (assigned to the control character/s) are erased.

       e) Extraction of alternative information:
30   The control character is unknown or is not to be displayed; however, information contained comprises alternative information which is to be displayed, possibly also with special marking.

35 Another development is that the mapping of the control characters takes place on a mobile computer, on an associated server or a proxy server.

It is also a development that a degree of scaling for detailing of the mapping is determined by the predetermined parameter. With this degree of scaling, an adaptation to a rate of display found to be
5   acceptable for the user is made possible with regard to the bandwidth available. For instance, the user may have as many features of the hypertext markup language as possible displayed to him, as long as the rate of display is found to be adequate.
10

With the method described, it is possible to respond flexibly to different control characters, including those newly added, and to agree on a specific adaptation of the mapping for each control character or
15   a group of control characters. Specifically in the case of HTML and its successors, there are constantly new features and special formatting possibilities, the mapping, conversion or removal of which are of significance in particular for the display on a mobile
20   computer.

Also specified for achieving the object is a device for mapping control characters provided with a process unit which is set up in such a way that
25   a) the control characters are elements of a hypertext markup language;
       b) first data can be read in;
       c) predetermined control characters can be ascertained in the first data;
30   d) the control characters can be used to map the first data onto second data according to a predetermined parameter.

This device is suitable in particular for carrying out
35   the method according to the invention or one of its developments explained above.

Exemplary embodiments of the invention are presented and explained below with reference to the drawing, in which:

5   figure 1   shows a block diagram with steps of a method for mapping control characters;

figure 2   shows a block diagram with mapping alternatives;

10

figure 3   shows a scenario comprising a mobile computer and server;

figure 4   shows a processor unit.

15

Figure 1 shows a block diagram with steps of a method for mapping control characters which are elements of a hypertext markup language. In a block 101, first data are read in; in a block 102, control characters are

20   ascertained in the first data. In a block 103, the control characters found are used to map the first data onto second data according to a predetermined parameter. In this case, the second data may be empty. The second data may in turn also comprise control

25   characters, but the control characters contained in the second data are understood by the computer on which the data are prepared (for example on a mobile computer).

Figure 2 shows a block diagram with alternative

30   possible ways of realizing the mapping of the control character or the control characters 201. As already mentioned, the mapping can be carried out in various ways. The possibilities based on HTML notation are illustrated below.

a) Identical mapping, see block 202:

The control character belongs to the known control characters and is passed on unchanged. Display takes place on the mobile computer.

5   Example:

<A HREF="http://www.test.de"> A link </A>

remains unchanged

b) Extraction of information, see blocks 203, 204:

10   The control character is unknown or is not to be displayed. However, the information contained is to be displayed, preferably transparently (that is without further control information).

Example:

15   **<DFN> Any text <DFN>**

becomes "any text".

c) Conversion to similar control characters, see block 206:

20   The control character is unknown or is not to be displayed, reverting instead to an alternative control character, preferably with a similar effect.

Example:

25   **2nd**

is converted to

2<IT>nd</IT>.

d) Erasure, see block 207:

30   The control character is unknown or is not to be displayed; information possibly contained is also not of interest: control character/s and information (assigned to the control character/s) are erased.

35   Example:

<SCRIPT>function...</SCRIPT>

is deleted completely.

e) Extraction of alternative information, see blocks
203, 205:

The control character is unknown or is not to be
displayed; however, information contained

5   comprises alternative information which is to be
displayed, possibly also with special marking.

Example:

<IMG="http://www.test.de/test.gif" ALT="A test">

becomes "[image: a test]".

10

In **figure 3**, a scenario comprising a mobile computer
301 and a fixed station (server) 302 is represented.
The mobile computer 301 transmits the predetermined
parameter, which scales the mode of the adaptation of

15   the control characters, that is adapts it specifically
to the hardware of the mobile computer 301 and possibly
the bandwidth of the communication interface 306, to
the server 302 by means of the air interface 305, 306,
304. Alternatively, the adaptation to the bandwidth of

20   the communication interface may also take place on the
server 302 side (the parameter is accordingly
predetermined there). The server 302 is a
representative of a computer network, indicated by the
Internet 303. The communication between the mobile

25   computer 301 and the server 302 takes place via the
communication interface 306 with the parameter taken
into account, the requirements and capabilities of the
mobile computer 301 and of the communication interface
306 specifically being taken into account.

30

In **figure 4**, a processor unit PRZE is represented. The
processor unit PRZE comprises a processor CPU, a memory
SPE and an input/output interface IOS, which is used in
different ways via an interface IFC: an output is made

35   visible on a monitor MON and/or is output on a printer
PRT via a graphics interface. An input takes place via
a mouse MAS or a keyboard TAST. The processor unit
PRZE also has a data bus BUS, which ensures the

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connection of a memory

MEM, the processor CPU and the input/output interface IOS. Furthermore, additional components, for example additional memories, data storage units (hard disk) or scanners, can be connected to the data bus BUS.

Patent claims

1. A method for mapping control characters
   a) in which the control characters are elements of
      a hypertext markup language;
   b) in which first data are read in;
   c) in which predetermined control characters are
      ascertained in the first data;
   d) in which the control characters can be used to
      map the first data onto second data according to
      a predetermined parameter.

2. The method as claimed in claim 1, in which the
   second data represent the empty set.

3. The method as claimed in one of the preceding
   claims, in which the parameter characterizes
   underlying hardware.

4. The method as claimed in one of the preceding
   claims, in which the control characters are HTML
   tags.

5. The method as claimed in one of the preceding
   claims, in which the parameter is dynamically
   determined.

6. The method as claimed in one of the preceding
   claims, in which the parameter is ascertained on
   the basis of the resources of a computer on which
   the mapping takes place.

7. The method as claimed in one of the preceding
   claims, in which the parameter is ascertained on
   the basis of the resources of a communication
   connection between a first computer, on which the
   mapping takes place, and a second computer, which
   acts as a data server.

8. The method as claimed in claim 7, in which the first computer is a mobile computer.

9. The method as claimed in claim 7 or 8, in which the second computer is a computer from a network.

10. The method as claimed in claim 9, in which the network is the Internet.

11. The method as claimed in one of the preceding claims, in which the mapping of the control characters is carried out onto a subset of all the possible control characters.

12. The method as claimed in one of the preceding claims, in which the control characters are mapped as specified below, taking into account one of the following possibilities:
   a) the control character belongs to a predetermined set of known control characters: identical mapping takes place;
   b) the control character is unknown: the text contained is transparently mapped;
   c) the control character is unknown: it is mapped into a known control character;
   d) the control character is unknown: the text contained, including control characters, is erased;
   e) the control character is unknown: an alternative text entry is sought and is transparently displayed.

13. The method as claimed in one of the preceding claims, in which the mapping takes place on a mobile computer, on an associated server or in a proxy server.

14. The method as claimed in one of the preceding claims, in which the predetermined parameter is used for determining a

degree of scaling for detailing of the mapping.

15. A device for mapping control characters provided with a processor unit which is set up in such a way that
    a) the control characters are elements of a hypertext markup language;
    b) first data can be read in;
    c) predetermined control characters can be ascertained in the first data;
    d) the control characters can be used for mapping the first data onto second data according to a predeterminable parameter.

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Abstract

Method and device for mapping control characters

A method for mapping control characters in which the control characters are elements of a hypertext markup language is specified. First data are read in and predetermined control characters are ascertained in the first data. The control characters are used to map the first data onto second data according to a predetermined parameter.

Patent claims

1. A method for mapping control characters (201),
    a) in which the control characters are elements of
       a hypertext markup language;
    b) in which first data are read in (101);
    c) in which predetermined control characters are
       ascertained in the first data (102);
    d) in which the control characters can be used to
       map the first data onto second data according to
       a predetermined parameter (103)
    e) in which the parameter is dynamically
       determined, the parameter being ascertained on
       the basis of the resources of a computer on
       which the mapping takes place and/or ascertained
       on the basis of the resources of a communication
       connection between a mobile first computer and a
       second computer, which acts as a data server.

2. The method as claimed in claim 1, in which the
    second data represent the empty set.

3. The method as claimed in one of the preceding
    claims, in which the parameter characterizes
    underlying hardware.

4. The method as claimed in one of the preceding
    claims, in which the control characters are HTML
    tags.

5. The method as claimed one of the preceding claims,
    in which the second computer is a computer from a
    network.

6. The method as claimed in claim 5, in which the
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network is the Internet.

7. The method as claimed in one of the preceding
    claims, in which the mapping of the control
    characters is carried out onto a subset of all the
    possible control characters.

8. The method as claimed in one of the preceding
    claims, in which the control characters are mapped
    as specified below, taking into account one of the
    following possibilities:
    a) the control character belongs to a predetermined
       set of known control characters: identical
       mapping takes place;
    b) the control character is unknown: the text
       contained is transparently mapped;
    c) the control character is unknown: it is mapped
       into a known control character;
    d) the control character is unknown: the text
       contained, including control characters, is
       erased;
    e) the control character is unknown: an alternative
       text entry is sought and is transparently
       displayed.

9. The method as claimed in one of the preceding
    claims, in which the predetermined parameter is
    used for determining a degree of scaling for
    detailing of the mapping.

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